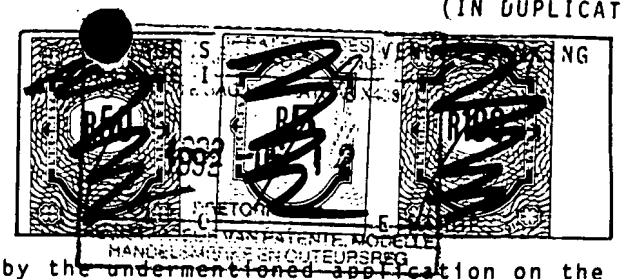
FORM P.1.
(IN DUPLICATE)



REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

APPLICATION FOR A PATENT

AND ACKNOWLEDGEMENT OF RECEIPT

(SECTION 30(1) - REGULATION 22)

The grant of a patent is hereby requested by the undermentioned application on the basis of the present application filed in duplicate

| OFFICIAL APPLICATION NO. | | | (i) OUR REFERENCE |
|---|---|---|---|
| 21 | 01 | 924298 | 327111 |

(ii) FULL NAME(S) OF APPLICANT(S)

| | |
|---|---|
| 71 | NATIONAL BRANDS LIMITED |

(iii) ADDRESS(ES) OF APPLICANT(S)

P O Box 17386 CONGELLA 4013

(iv) TITLE OF INVENTION

| | |
|---|---|
| 54 | OXYGEN SCAVENGER SYSTEM |

(v) PRIORITY IS CLAIMED AS SET OUT ON THE ACCOMPANYING FORM P.2.

~~(vi) THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO.~~

| | | |
|---|---|---|
| 21 | 01 | |

~~(vii) THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON APPLICATION NO.~~

| | | |
|---|---|---|
| 21 | 01 | |

(viii) THIS APPLICATION IS ACCOMPANIED BY

- [XX] 1. ~~A single copy of a provisional or~~ two copies of a complete specification of ...11.. pages.
- [ ] 2. Drawings of ..... sheets.
- [XX] 3. Publication particulars and abstract (form P.8. in duplicate).
- [ ] 4. A copy of Figure ..... of the drawings (if any) for the abstract.
- [ ] 5. Assignment of invention.
- [ ] 6. Certified priority document(s) (State number).
- [ ] 7. Translation of the priority document(s).
- [ ] 8. An assignment of priority rights.
- [XX] 9. A copy of the form P.2. and the specification of S.A. Patent Application No. 21 | 01 | 91/1866
- [ ] 10. A declaration and power of attorney on form P.3.
- [ ] 11. Request for ante-dating on form P.4.
- [ ] 12. Request for classification on form P.9.
- [ ] 13.

(ix) ADDRESS FOR SERVICE: IAN MORRISON & CO, P O BOX 1025, DURBAN, 4000

Dated this 12th day of June 1992

.....
IAN MORRISON & CO
APPLICANT'S PATENT ATTORNEYS

REGISTRAR OF PATENTS, PATENTS, DESIGNS, TRADE MARKS ACT

RECEIVED

OFFICIAL DATE STAMP
1992 -06- 12

.....
REGISTRAR OF PATENTS
REGISTRATEUR VAN PATENTE, MODELLE, HANDELSMERKE EN OUTEURSREG

IAN MORRISON & CO.

FORM P.7
(In duplicate)

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
COMPLETE SPECIFICATION
(Section 30 (1) - Regulation 28)

| OFFICIAL APPLICATION NO. | | LODGING DATE | | OUR REFERENCE |
|---|---|---|---|---|
| 21 | 01 924298 | 22 | 1992 -06- 12 | 327111 |

INTERNATIONAL CLASSIFICATION

| | |
|---|---|
| 51 | B65B; A23L |

FULL NAME(S) OF APPLICANT(S)

| | |
|---|---|
| 71 | NATIONAL BRANDS LIMITED |

FULL NAME(S) OF INVENTOR(S)

| | |
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| 72 | HECTOR JEAN HONORE DE MUELENAERE and KAMLASHKUMAR DEVCHAND |

TITLE OF INVENTION

| | |
|---|---|
| 54 | OXYGEN SCAVENGER SYSTEM |

## FIELD OF THE INVENTION

This invention relates to the preservation of foodstuffs and other related products which are prone to oxidation by atmospheric oxygen, particularly in their packaged form.

## BACKGROUND OF THE INVENTION

Many foodstuffs are prone to oxidation even when sealed in a gas impermeable package, due to unavoidable inclusion or occlusion of atmospheric oxygen during the packaging procedure. It is an object of the present invention to provide a method and an article of commerce which effectively prevents or at least greatly reduces such oxidation in a simple and inexpensive manner.

## SUMMARY OF THE INVENTION

According to the present invention a process for reducing oxidation of foodstuffs and related products, includes the step of including within the package of such foodstuff or the like, a quantity of an oxygen scavenger or absorbent in an amount sufficient to scavenge or absorb the oxygen present in the package and a carbon dioxide generator in an amount sufficient to prevent collapse of the package due to the loss of pressure caused by oxygen scavenging or absorption..

In a preferred form of the invention the oxygen scavenger or absorbent is contained in a sachet or other container which is gas permeable and which is includable in the package containing the foodstuff.

Oxygen scavengers or absorbents may include powdered metal such as iron, iron oxide, ascorbic acid, ferrous salts, sulphur, sulphites, copper sulphate and the like.

However, it is preferred to use a finely powdered metal which is inactive in the presence of water and normal atmosphere and to which a catalyst or initiator is added - for example an acid or salt or very weak base that initiates the oxidation of the metal powder.

The fine powdered metal may be a fine powdery metal substance which has been reduced by a chemical process. The metal could include alloys or metal compounds of iron which have been reduced from their oxidised state in a stream of hydrogen to form a stable reduced metal that is inert to oxidation under normal atmospheric conditions. These metals can be used singly or in a form of a mixture.

The initiator or catalyst that can be employed to activate the metal and initiate the oxidation reaction can be citric acid, oxalic acid, ascorbic acid, malic acid and salts such as sodium citrate, sodium chloride, sodium sulphate, sodium sulphite and with bases such as sodium hydroxide, sodium carbonate, bicarbonate, as well as iron salts.

A desiccant or reaction controlling medium may also be added and this could be chosen from silica gel, activated alumina, diatomaceous earth, activated clay, molecular sieve, zeolite, gypsum, anhydrous

sodium sulphate and anhydrous calcium chloride. In the present invention it is preferred that the metal component as well as the initiator has as small a grain size as possible for producing an effective oxygen scavenge. The particle size should be smaller than 100 mesh while the particle size of the reaction control medium should be smaller than 60 mesh and larger than 100 mesh. The mixture can be used in the powdered form or granulated with a binder.

The carbon dioxide generator may be included in the mixture or may be provided as a separate entity. Thus, in one form of the invention a mixture of oxygen scavenger, catalyst, desiccant, and carbon dioxide generator may be provided, or else the oxygen scavenger may be separate from the other products.

The present invention allows the oxygen scavenging mix to be prepared under normal atmospheric conditions without the oxygen scavenging system being activated. Reduced iron (or similar reduced metals) are inactive under normal atmospheric conditions. It will only be activated if sufficient water is available in the presence of an initiator such as citric acid which elevates the activation energy of the reduced iron. The oxygen absorption in an enclosed system results in a vacuum being generated which in turn will lead to compression or deforming of the food product which is enclosed in the package. By simultaneously generating carbon dioxide at the same rate as oxygen is being removed from the system the creation of a detrimental low pressure will be eliminated. This latter mechanism is achieved by incorporation of a carbon dioxide releasing agent in the sealed package.

The invention is illustrated more particularly by the following examples, but it is to be understood that the present invention is not limited to the particular forms shown.

Example 1

| | g | % |
|---|---|---|
| Reduced iron | 0,75 | 25,0 |
| Citric acid | 0,25 | 8,3 |
| Silica gel | 2,00 | 66,7 |

In the same manner as in example 1 oxygen scavengers may be prepared using different kinds of desiccants and varied concentrations of reduced iron and citric acid.

Example 2

| | g | % |
|---|---|---|
| Reduced iron | 0,75 | 23,0 |
| Sodium sulphite | 0,5 | 15,4 |
| Silica gel | 2,0 | 61,6 |

In the same manner as in example 2 oxygen scavengers may be prepared using different types of initiators at varied concentrations.

Example 3

| | g | % |
|---|---|---|
| Reduced iron | 0,75 | 21,4 |
| Citric acid | 0,25 | 7,2 |
| Silica gel | 2,00 | 57,1 |
| Activated charcoal | 0,5 | 14,3 |

Example 3 illustrates an oxygen scavenger mixture which uses activated charcoal which can be used in combination with silica gel. The activated charcoal serves to remove unwanted odours which may otherwise taint the food product.

The ratio of reduced iron and silica gel can be varied depending upon the type of product to be stored, the volume of residual air in sealed container or package, water activity of product or moisture content. The proposed mixture may be packed into small sachets of 40 mm x 40 mm of gas permeable material. Larger sachets 100 mm x 80 mm containing granulated oxygen scavenger mixture can be used for large containers.

Example 4

| | g | % |
|---|---|---|
| Reduced iron | 0,75 | 21,4 |
| Citric acid | 0,25 | 7,2 |
| Silica gel | 2,00 | 57,1 |
| Carbonating agent | 0,5 | 14,3 |

The above example illustrates an oxygen scavenger mixture which uses a carbonating agent which gradually replaced the oxygen absorbed with carbon dioxide thus prevent any collapse in package due to oxygen absorption or the presence of vacuum due to cooling of hot product in sealed package. The carbonating agent may be a complex or double salt prepared from magnesium chloride and potassium bicarbonate by co-precipitation and is represented by the formula $MgCO_3KHCO_3 4H_2O$.

Example 5

| | g | % |
|---|---|---|
| Citric acid | 0,5 | 16,7 |
| Silica gel | 2,0 | 66,6 |
| Carbonating agent | 0,5 | 16,7 |

The above example illustrates a carbon dioxide generating system which could be used on its own as a separate entity in conjunction with an oxygen scavenger system. The carbonating agent is similar to the one described above.

CLAIMS:

1.

A process for reducing oxidation of foodstuffs and related products, includes the step of including within the package of such foodstuff or the like, a quantity of an oxygen scavenger or absorbent in an amount sufficient to scavenge or absorb the oxygen present in the package and a carbon dioxide generator in an amount sufficient to prevent collapse of the package due to the loss of pressure caused by oxygen scavenging or absorption..

2.

The process according to claim 1 in which the oxygen scavenger or absorbent is contained in a sachet or other container which is gas permeable and which is includable in the package containing the foodstuff.

3.

The process according to either of the above claims in which the oxygen scavengers or absorbents are chosen from powdered metal such as iron, iron oxide, ascorbic acid, ferrous salts, sulphur, sulphites, copper sulphate and the like.

4.

The process according to claim 1 or claim 2 in which the oxygen scavenger is a finely powdered metal which is inactive in the presence of water and normal atmosphere and to which a catalyst or initiator is added.

5.

The process according to claim 4 in which the catalyst or initiator is an acid or salt or very weak base that initiates the oxidation of the metal powder.

6.

The process according to claim 3 or claim 4 in which the powdered metal is a fine powdery metal substance which has been reduced by a chemical process.

7.

The process according to any of claims 3 to 6 in which the metal includes alloys or metal compounds of iron which have been reduced from their oxidised state in a stream of hydrogen to form a stable reduced metal that is inert to oxidation under normal atmospheric conditions.

8.

The process according to any of claims 4 to 7 in which the initiator or catalyst is chosen from citric acid, oxalic acid, ascorbic acid, malic acid and salts such as sodium citrate, sodium chloride, sodium sulphate, sodium sulphite; and bases such as sodium hydroxide, sodium carbonate, bicarbonate, as well as iron salts.

9.

The process according to any of the above claims including a desiccant chosen from silica gel, activated alumina, diatomaceous earth, activated clay, molecular sieve, zeolite, gypsum, anhydrous sodium sulphate and anhydrous calcium chloride.

10.

The process according to any of the above claims in which the compounds used have as small a particle size as possible.

11.

The process according to claim 10 in which the particle size is smaller than 100 mesh.

12.

A composition for use in the process as claimed in any of the above claims comprising a mixture of oxygen scavenger, catalyst, desiccant, and carbon dioxide generator.

13.

The process according to any of claims 1 to 12 in which the oxygen scavenger or absorbent is in a gas permeable container separate from the other substances.

14.

A composition substantially as described with reference to any of the examples.

Dated this 12th day of June 1992

IAN MORRISON & COMPANY

APPLICANT'S PATENT ATTORNEYS